

1. FEATURES

- ◇ Easy and correct readout.
- ◇ High measuring accuracy.
- ◇ Measurements are possible even under a strong magnetic field.
- ◇ LSI-circuit provides high reliability and durability.
- ◇ Input overload protection is provided.
- ◇ LCD display for low power consumption and clear readout even in bright ambient light conditions.
- ◇ Light-weight and compact construction for easy operation.
- ◇ Low battery condition is indicated on the LCD display.

2. SPECIFICATIONS

2-1.GENERAL SPECIFICATIONS

Display: LCD (Liquid Crystal Display) Max. Indication 1999.

Measurement: C (Capacitance)

Range: single 9 position, whole range value (from 0.1pF to 20000uF)

Zero Adjustment :Manual (range: ± 20 pF)

Calibrate Adjustment: Have two internal adjustments. One is panel Zero adjustment.

Over-input :Display shows “ ”.

Backlight Function: it went out by itself within 8 seconds.

Sampling Time: 0~5second

Operating Temp :0°C to 40°C.

Operating Humidity: 80% MAX.R.H.

Power Supply : Single, standard 9 volt battery. NEDA 1604IEC6F22

Typical consumption current: 3~4mA (RANGE: 200pF-200uF)

Standard Accessories: Test alligator clips (red & black)...1 pair.

Instruction manual.....1 pc.

2-2. ELECTRICAL SPECIFICATION

Accuracy is \pm (percentage of reading + number of digit) at $23 \pm 5^{\circ}\text{C}$, $<80\%\text{RH}$.

Range	Accuracy	Resolution	Test Frequency	Max indication value
200pF	$\pm (0.5\%+7)$	0.1pF	800Hz	199.9pF
2nF	$\pm (0.5\%+5)$	1pF	800Hz	1.999nF
20nF		10pF	800Hz	19.99nF
200nF		100pF	800Hz	199.9nF
2uF		1000pF	800Hz	1.999uF
20uF		0.01uF	80Hz	19.99uF
200uF		0.1uF	8Hz	199.9uF
2000uF	$\pm (2\%+5)$	1uF	8Hz	1999uF
20000uF	$\pm (3\%+10)$	10uF	8Hz	1999($\times 10$)uF

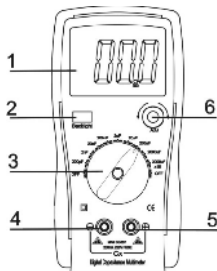
pF= Pico Farad(10^{-12}F), nF= nan Farad(10^{-9}F). uF= micro Farad(10^{-6}F)

Excitave voltage: Max.2.8Vrms

Overload Rating: Protection by a 0.1A/36V fuse.

3. OPERATION PANEL

1. LCD display: display the test value and unit.
2. Backlight key: press the button lightly; it was turning off by itself about 8 seconds.
3. Function Selector: It is used for power on and changes the range of function.
4. Capacitance '—' input terminal.
5. Capacitance '+' input terminal.
6. Zero knob: Knob to zero when test low capacitance.



4. CONSIDERATION OF MEASUREMENT

- (1) This C METER is intended for measuring the capacitance value of a capacitor. It is not intended for determining the “Q” factor for above reactive components. Misleading readings may be obtained if the measurement of capacitance of a resistor is attempted.

- (2) When measuring components within circuit that circuit must be switched off and de-energized before connecting the test leads.
- (3) Do not close (black & red) test leads.
- (4) Instruments used in dusty environments should be stripped and cleaned periodically.
- (5) Do not leave the instrument exposed to direct heat from the sun for long periods.
- (6) Before removing the battery and fuse compartment cover, ensure that the instrument is disconnected with any circuit and the power switch is in the off position.
- (7) For all measurements, should connect BLACK test lead into “-” terminal and RED test lead into “+” terminal.

5. CAPACITANCE(C) MEASURING PROCEDURE

- (1) Select the range selector for the maximum expected capacitance.
- (2) The power will on when the selector switch away from OFF position.
- (3) Check "0" indication: If test range is 200pF, 2nF, 20nF, should check "0" indication before test.
- (4) Observe polarity when connecting polarized capacitors.
- (5) Full discharge any capacitors.
- (6) Connect the alligator clips to the capacitors leads.
- (7) Read the display. The value is direct reading in the electrical unit (pF, nF, uF) indicated at the selected range switch. If display show “1”, It indicate on Out-of-Range measurement. If the display indicates one or more leading zeros, shift to the next lower range scale to improve the resolution of the measurement.

NOTE:

- (a) If the capacitance value is unmarked, start with the 200pF range and keep increasing until the over-range indication goes off and a reading is obtained.
- (b) A shorted capacitor will read over-range on all ranges. A capacitance with low voltage leakage will read over range, or a much higher value than normal. An open capacitor will read zero on all ranges (possibly a few pF on 200pF range, due to stray capacitance of the instrument).
- (c) Measure of very low capacitance should be performed using extremely

short leads in order to avoid introducing any stray inductance.

- (d) When using the optioned test leads, remember that the leads introduce a measurable capacitance to the measurement. As a first approximation, the test lead capacitance may be measured by opening the leads at the trips, recording the open circuit value and subtracting that value.
- (e) Capacitors, especially electrolytic, often have notoriously wide tolerances. Do not be surprised if the measured value is greater than the value marked on the capacitor, unless it is a close tolerance type. However, values are seldom drastically below the rated value.
- (f) If changing range, measured value will be changed; leakage-voltage capacitors will be checked also. Leakage-resistance will be decreased in lower range.

6. MAINTENANCE

1) 9-Volt battery replacement

- a. Ensure the instrument is not connected to any external circuit. Set the selector switch to OFF position and remove the test leads from terminals.
- b. Remove the screw on the bottom case and lift the bottom case.
- c. Remove the spent battery and replace it with a battery of the same type.

2) Fuse replacement

- a. Ensure the instrument is not connected to any external circuit. Set the selector switch to OFF position and remove the test leads from terminals.
- b. Remove the screw on the bottom case and lift the bottom case.
- c. Replace the fuse with the same type and rating: $5 \times 20\text{mm}$, 200mA/250V, fast-blow fuse or as the replacements.

- The specifications are subject to change without notice.
- The content of this manual is regarded as correct, error or omits Pls. contact with factory.
- We hereby will not be responsible for the accident and damage caused by improper operation.
- The function stated for this User Manual cannot be the reason of special usage.

MT-5110 3 1/2 數位電容錶

1. 特色

- ◇ 容易正確的測量結果輸出值。
- ◇ 測量精度高。
- ◇ 在強大的磁場下依然可以測量。
- ◇ LSI 電路提供高可靠性和耐久性。
- ◇ 提供輸入過載保護。
- ◇ LCD 低功耗和清楚顯示測量結果即使在明亮室內光線狀況下。
- ◇ 重量輕和小型機構設計容易操作。
- ◇ LCD 上會顯示低電壓狀態。

2. 說明

2-1.一般說明

顯示：LCD(液晶顯示螢幕) 最大讀值 1999。

測量：C(電容量)

範圍：9 個檔位, 全範圍值從 0.1pF to 20000uF

歸零調整：手動(範圍：±20pF)

校驗調整：內含 2 個調整裝置。其中 1 個是歸 0 調整。

輸入超過：螢幕顯示 “1”

背光功能：8 秒內。

採樣時間：0 ~5second

操作溫度：0 ~40 °C, 最大濕度：80%.R.H.

電源：1 個標準的 9 伏特電池。 NEDA 1604IEC 6F 22

標準消耗電流：3~4 毫安 (範圍：200pF - 200uF)

標準配件：測試鱷魚夾子(紅和黑色) 1 對

操作說明書 1 本。

2-2. 電氣規格

精度為 \pm (讀數的百分比+個位數) 在 23 ± 5 , $\leq 80\%$ 相對濕度。

範圍	精準度	分辨率	測試頻率	最大顯示值
200pF	$\pm(0.5\%+7)$	0.1pF	800Hz	199.9pF
2nF	$\pm(0.5\%+5)$	1pF	800Hz	1.999nF
20nF		10pF	800Hz	19.99nF
200nF		100pF	800Hz	199.9nF
2uF		1000pF	800Hz	1.999uF
20uF		0.01uF	80Hz	19.99uF
200uF		0.1uF	8Hz	199.9uF
2000uF	$\pm(2\%+5)$	1uF	8Hz	1999uF
20000uF	$\pm(3\%+10)$	10uF	8Hz	1999($\times 10$)uF

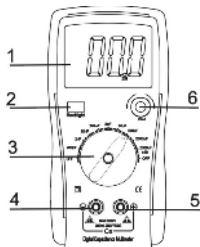
pF= Pico Farad(10^{-12} F) , nF= nan Farad(10^{-9} F). uF= micro Farad(10^{-6} F)

Excititive voltage: Max.2.8Vrms

功率超載：由 0.1A/36V 保險絲保護。

3. 操作面板

- 1.LCD 螢幕：顯示測試值和單位。
- 2.背光按鍵：輕輕按下按鈕，約 3 秒後自動關閉。
- 3.功能旋鈕：用於啟動及更改功能範圍。
- 4.電容輸入端 '—'。
- 5.電容輸入端 '+'。
- 6.零旋鈕：低電容測試時為零。



4. 測量注意事項

- (1) 這台電容測試器用於測量一個電容器的電容量值。其目的不是確定“Q”因素對上述零件的反應。如果測量電阻，可能獲得誤導性的讀值。
- (2) 當測量零件內部迴路前，必須確認這個迴路必須在沒有通電的狀態下，電路必須被關掉並且切斷。
- (3) 不要關閉（黑色和紅色）測試線。

- (4) 在佈滿灰塵的環境裡使用儀器應該週期性地清潔。
- (5) 不要長期把儀器暴露在太陽下。
- (6) 取出電池和打開保險絲蓋子之前，確認儀器任何電路和電源開關處於關閉位置。
- (7) 所有的測量，應該連接到黑色測試線“-”和紅色測試線“+”。

5. 電容 (C) 測量步驟

- (1) 將功能旋鈕轉到待測試電容的預期最大值選擇的範圍
- (2) 電源同步開啓。
- (3) 檢查‘0’表示：如果測試的範圍是 200pF, 2nF, 20nF, 應測試前檢查‘0’字樣表示。
- (4) 當測試有極性電容器時，檢查其極性。
- (5) 充分的執行任何電容器放電。
- (6) 把鱷魚夾子和電容器連結起來。
- (7) 讀取螢幕顯示的數值，電容值單(pF, nF, uF)裡的直接讀取，如果螢幕顯示‘1’表示測量結果超過選定測量範圍。如果螢幕顯示一個或多個零在數字前面，切換到下一個較低的範圍當位提高分辨率。

注意：

- (a) 如果不知道待測物品電容量值，從 200pF 範圍開始並且持續增加，直到超量指示熄滅及讀取到讀值。
- (b) 一個短路的電容測量時會顯示超過量測範圍的讀值。與正常的電容相比較，有低電壓漏電的電容量讀值將會較高或超過範圍。
- (c) 一個開放閱讀零電容將在所有範圍(可能是幾 pF 的範圍上 200pF, 由於雜散電容的儀器)
- (d) 為了避免引起任何雜訊，測量非常低的電容量應該使用極其短的測試線執行。
- (e) 當使用任選的測試表筆時，記住表筆可能引入一個的電容。首先，測試表筆應在打開筆尖的情況下，測出該表筆的電容，記錄其開路值並從測試結果中減去此值。
- (f) 電容器，特別是電解電容，往往有廣泛的公差。不要感到驚訝，如果測量值大於標在電容器上的值，除非它是一個緊公差，不管如何

測量值很少大幅低於額定值。

- (g) 如果更改範圍內，測量值將被改變，電容器漏電壓也將進行檢查。漏電電阻將下降下限。

6. 維修

1) 9 伏特的電池更換

- a. 確認儀器不連接任何外部電路。確定選擇器轉向為 OFF 位置並且去測試線。
- b. 取下底蓋的螺絲與蓋子。
- c. 取出電池並更換一個同類型的電池。

2) 保險絲更換

- a. 確認儀器不連接任何外部電路。確定選擇器轉向為 OFF 位置並且除去測試線。
- b. 取下底蓋的螺絲與蓋子。
- c. 用相同的類型和等級的保險絲替換：5×20mm, 200mA/250V

本說明書如有改變，恕不另行通知

本說明書的內容被認為是正確的，若用戶發現有錯誤、遺漏等，請與生產廠家聯繫。

本公司不承擔由於用戶錯誤操作所引起的事故和危害。

本說明書所講述的功能，不作為將產品用做特殊用途的理由。

Pro'sKit[®]

寶工實業股份有限公司
PROKIT'S INDUSTRIES CO., LTD.

<http://www.prokits.com.tw>

E-mail : pk@mail.prokits.com.tw



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